

DERWENT-ACC-NO: 2000-206276  
DERWENT-WEEK: 200259  
COPYRIGHT 1999 DERWENT INFORMATION LTD

TITLE: Vehicle safety harness for use with a seat such as  
a child's booster  
seat having a back rest and aperture has left and right  
shoulder straps passing  
through aperture, and upper ends of straps connectable to  
anchor point on  
vehicle frame

INVENTOR: BOWTELL, W J

PATENT-ASSIGNEE: IGC AUSTRALIA PTY LTD[IGCAN]

PRIORITY-DATA: 1997AU-0010101 (January 10, 1997) ,  
1999AU-0059355 (November 11,  
1999)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE
PAGES	MAIN-IPC	
AU 9959355 A	February 3, 2000	N/A
013	B60N 002/28	
AU 750497 B	July 18, 2002	N/A
000	B60N 002/28	

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO
APPL-DATE		
AU 9959355A	Div ex	1997AU-0010101
January 10, 1997		
AU 9959355A	N/A	1999AU-0059355
November 11, 1999		
AU 9959355A	Div ex	AU 715321
N/A		
AU 750497B	Div ex	1997AU-0010101
January 10, 1997		
AU 750497B	N/A	1999AU-0059355
November 11, 1999		
AU 750497B	Div ex	AU 715321
N/A		
AU 750497B	Previous Publ.	AU 9959355
N/A		

INT-CL (IPC): A47D013/08; B60N002/26 ; B60N002/28 ;  
B60R022/10 ;  
B62B009/24

RELATED-ACC-NO: 1997-503490

ABSTRACTED-PUB-NO: AU 9959355A

BASIC-ABSTRACT: NOVELTY - The harness includes a buckle portion, a left shoulder strap having a left upper end, and a right shoulder strap having a right upper end. The left and right shoulder straps are adapted to pass through the aperture, and the left and right upper ends are connectable to an anchor point on the frame of the vehicle.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is given for a booster seat adapted for use with the harness.

The booster seat includes a form composed of expanded polyurethane having a seat and back portions. The back portion has an aperture through which an anchor strap or respective left and right shoulder straps may pass.

USE - Vehicle safety harness for use with a child's booster seat.

ADVANTAGE - The harness is not prone to removal by a child. Fracturing of the resilient expanded polyurethane booster seat form over time is less likely. Wear and breakage is reduced.

DESCRIPTION OF DRAWING(S) - The drawing shows a harness in accordance with the invention.

Buckle 1

Crotch straps 5l, 5r

Hip straps 6l, 6r

Securing device 7l, 7r

Lap or lap-sash belt 8

Shoulder straps 9l, 9r

Anchor strap 10

Anchoring device 11

Optional adjustment device 12

CHOSEN-DRAWING: Dwg.1/3

TITLE-TERMS:

VEHICLE SAFETY HARNESS SEAT CHILD BOOST SEAT BACK REST  
APERTURE LEFT RIGHT  
SHOULDER STRAP PASS THROUGH APERTURE UPPER END STRAP  
CONNECT ANCHOR POINT  
VEHICLE FRAME

DERWENT-CLASS: A95 P26 Q14 Q17 Q22

CPI-CODES: A12-S02F; A12-T04B; A12-T04E;

ENHANCED-POLYMER-INDEXING:

Polymer Index [1.1]

018 ; P1592\*R F77 D01 ; S9999 S1309\*R ; S9999 S1434

Polymer Index [1.2]

018 ; ND01 ; Q9999 Q9325 ; Q9999 Q9234 Q9212 ; Q9999  
Q9289 Q9212

; K9905 ; B9999 B4024 B3963 B3930 B3838 B3747 ; B9999  
B5287 B5276

SECONDARY-ACC-NO:

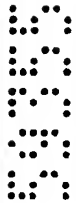
CPI Secondary Accession Numbers: C2000-063862

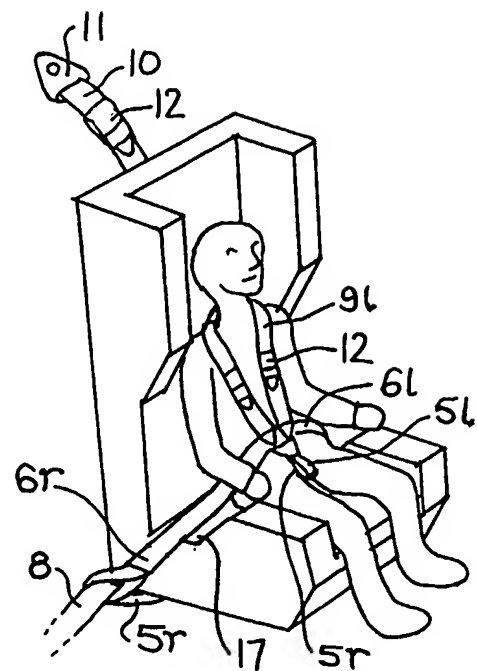
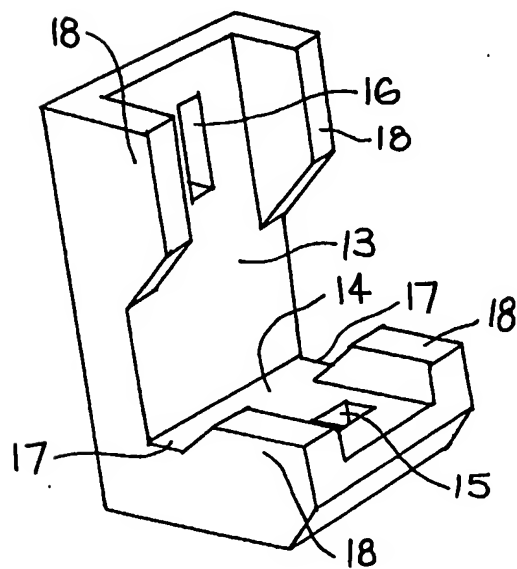
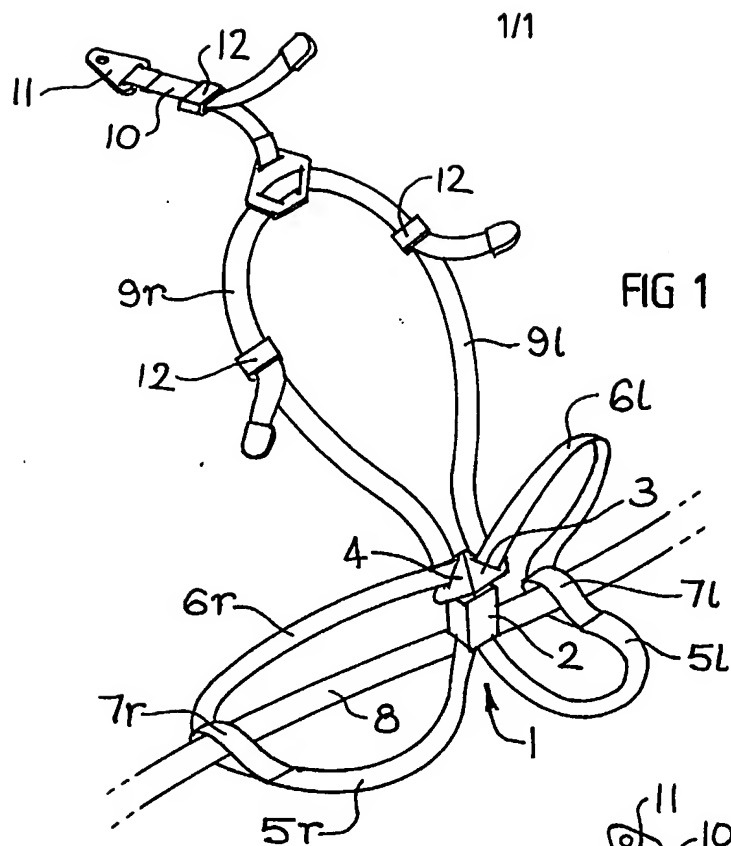
Non-CPI Secondary Accession Numbers: N2000-153494

## ABSTRACT

A harness adapted for use with a seat, the seat having a back rest with an  
5 aperture therein, the harness including a buckle portion, a left shoulder strap  
having a left upper end, and a right shoulder strap having a right upper end. The  
left shoulder strap and the right shoulder strap are adapted to pass through the  
aperture with the left upper end and the right upper end being connectable to an  
anchor point on a frame of a vehicle.

10





**AUSTRALIA**

***Patents Act 1990***

**ORIGINAL  
COMPLETE SPECIFICATION  
STANDARD PATENT**

Invention Title:     **Harness And Booster Seat**

The following statement is a full description of this invention, including the best method of performing it known to me/us:

## HARNESS AND BOOSTER SEAT

### Field of the Invention

The present invention relates to a vehicle safety harness and to a child's booster seat adapted for use therewith.

### 5 Definition

In describing the invention and the prior art, reference will be made to various straps and belts. It will be appreciated that in some circumstances, several associated straps or belts may be formed from a single integral length of strap or belt which is notionally divided into, for example, a lap belt and a sash belt. The  
10 junction between the associated straps or belts may be formed by a movable feature, such as a buckle. Description of straps or belts as separate features does not preclude the straps or belts actually being formed from one or more integral lengths of strap or belt.

### Background to the Invention

15 Various types of safety harnesses are known for restraining passengers in the event of a vehicle collision. The simplest of these is a lap belt, which runs around a passenger's lap and hips and is secured to the vehicle frame at either end. A two-part buckle is usually provided part way along the belt, usually near a hip of the user, to facilitate the putting on and taking off of the belt. The buckle  
20 divides the belt into a left portion and a right portion.

A second type of harness is a lap-sash belt. This harness has a lap-belt as previously described, with the addition of a diagonal sash-belt passing over the passenger's shoulder to their opposite hip. This type of belt usually has three anchor points, one at each end of the lap belt and one at the shoulder end of the  
25 sash belt. The hip end of the sash belt may be secured to a first part of the buckle on the lap belt, but more usually is continuous with a portion of the lap belt, the first part of the buckle being freely movable along the length of the continuous lap-

sash belt. The first part of the buckle defines the junction of the lap belt and the sash belt when in use.

Neither the lap belt or lap-sash belt type of harness is suitable if the passenger is of small stature, for example, an infant or young child. This is  
5 because the anchor point for the sash belt is usually too high for the belt to be properly positioned. In addition, the centre of gravity of an infant or young child is lower than that of an adult, with the result that in a collision, a child would slide out of lap or lap-sash harness by passing beneath the lap belt, a phenomenon known as "submarining".

10 To restrain a child or infant, a number of methods are used. For an infant or very young child, a "safety seat" or "capsule" is used. A safety seat comprises a substantially rigid shell in the form of a seat in which the child is placed. The safety seat is anchored to the vehicle seat by passing a lap belt or lap-sash belt through apertures in the lower portion of the safety seat, and anchoring the upper  
15 portion of the seat to an anchor point on the vehicle frame, usually located immediately behind the vehicle seat. The child or infant is held in the safety seat by a harness, which is anchored to the rigid shell of the safety seat. Such a harness, known as a "six-point harness" typically comprises a three part buckle which in use is situated centrally on the abdomen of the child. The three part  
20 buckle comprises a lower portion, a left upper portion and a right upper portion, the left and right upper portions being removably fastened to the lower portion.

The lower portion of the buckle is connected to a left and a right crotch strap. The crotch straps pass between the legs of the child to prevent submarining. The left upper portion of the buckle is connected to a left shoulder  
25 strap and a left hip strap, while the right upper portion of the buckle is connected to a right shoulder strap and a right hip strap. When the three buckle parts are fastened together for use, six straps lead away from the buckle and are anchored to the safety seat.

For a larger child, a "booster seat" is used. A booster seat is typically a light  
30 weight form, often composed of polystyrene covered with a layer of foam



cushioning and fabric. Booster seats are not anchored to the vehicle seat in any way. A child sitting on a booster seat is raised up by the thickness of the booster seat. Both the child and the booster seat are held against the vehicle seat by a harness acting principally on the child. The weight of the child and the action of  
5 the harness also act to keep the booster seat in place. The harness may be a lap-sash type since the booster seat will raise the child to allow better placement of the sash against the torso of the child. However, sash placement may still not be adequate to afford proper restraint, and a young child may easily remove a sash portion of the harness from its torso.

10 To counter this, booster seat harnesses are used. A booster seat harness is adapted to work in conjunction with a lap or a lap-sash belt. For a lap-sash belt, the sash portion of the belt is usually fastened to the lap portion of the belt to form a bight in which the first part of the buckle is situated. An anchor strap is attached to the anchor point behind the vehicle seat, and leads over the back of the booster  
15 seat to a point behind and slightly above the child's head. From this point, left and right shoulder straps are attached to the anchor strap, each passing over the child's shoulders and being connected to the lap belt or the bight of the lap-sash belt. Typically, each shoulder strap is equipped with at least one loop adjacent its free end, through which the lap belt or bight of the lap-sash belt is passed. By  
20 providing a number of adjacent loops, crude adjustment of the position of the lap or lap-sash belt possible. Whilst this type of harness is less prone to partial removal by a child, it does not prevent submarining in the event of an accident. A further problem is that as the anchor strap passes over and presses against the top of the booster seat, considerable pressure may be exerted on the polystyrene  
25 foam, causing it to fracture over time. Reinforcing in the form of inelastic adhesive tape is often added to the form to attempt to counter this.

The present invention seeks to overcome or alleviate one or more of the problems associated with the prior art.

#### **Brief Description of th Invention**

30 Accordingly, the present invention provides a harness adapted for use with

a seat, the seat having a back rest with an aperture therein, said harness including:

a buckle portion;

a left shoulder strap having a left upper end;

5 a right shoulder strap having a right upper end;

the left shoulder strap and the right shoulder strap being adapted to pass through the aperture with the left upper end and the right upper end being connectable to an anchor point on a frame of a vehicle.

10 Advantageously, the left and right upper ends are connected to an anchor strap, the anchor strap being adapted to pass through the aperture and being connectable to the anchor point on the frame of the vehicle.

The left and right shoulder straps are preferably connected between the buckle portion and the anchor strap.

15 Preferably, the respective lower ends of the left and right shoulder straps may be connected to respective left and right hip straps.

20 In use, the buckle portion is situated on the abdomen of a passenger in a vehicle, the left and right shoulder straps preferably passing from the buckle to a point behind and preferably slightly above the head of the passenger, where they are connected with the anchor strap. The left and right hip straps pass from the buckle portion to either side of the passenger, encircling the passenger's hips to connect with the respective left and right securing means. The left and right crotch straps pass from the buckle portion, between the passenger's legs and connect with the respective left and right securing means.

25 Preferably, one or more of the anchor straps, the left and right shoulder straps, the left and right hip straps and the left and right crotch straps are provided

with adjustment means, whereby the length of the strap may be adjusted.

In particularly preferred embodiment, the buckle portion comprises a three-part buckle having a lower buckle portion to which the crotch straps are attached, a left buckle portion to which the left shoulder and hip straps are attached and a  
5 right buckle portion to which the right shoulder and hip straps are attached. The left and right buckle portions may be removably fastened to the lower buckle portion to fasten the harness in place about the passenger.

The invention also provides a booster seat adapted for use with the harness hereinbefore described. The booster seat according to the invention  
10 includes a form having a seat portion and a back portion, the form preferably being composed of a resilient flexible material, the form being adapted for use with a harness as hereinbefore described, by the provision of an aperture in the back portion of the form through which the anchor strap may pass and an aperture in the seat portion through which the left and right crotch strap may pass, the left  
15 and right hip straps passing to either side of the form to connect with the left and right securing means.

The resilience of expanded polyurethane means that fracturing of the form is less likely, so that reinforcing tape is generally not required.

The provision of an aperture in the back of the form through which the  
20 anchor strap may pass reduces the load upon the back portion of the form, thereby reducing the likelihood of wear and breakage. In addition, the aperture allows the junction of the left and right shoulder straps to be correctly positioned behind the head of the passenger.

### Description of Drawings

25 The invention will now be discussed with regard to the drawings in which:

Figure 1 depicts a schematic view of a harness in accordance with the invention.

Figure 2 depicts a perspective view of a booster seat in accordance with the invention.

Figure 3 depicts the harness and booster seat of the invention in use on a passenger.

## 5 Description of preferred embodiments

In figure 1, a buckle 1 having a lower portion 2 a left upper portion 3 and a right upper portion 4. Lower portion 2 is connected to crotch straps 5l, 5r which is connected to securing means 7l, 7r in the form of loops. Hip straps 6l, 6r are also connected to securing means 7l, 7r. The loops which form securing means 7l, 7r may be formed using the ends of crotch straps 5l, 5r, or from the end of hip straps 6l, 6r or may be formed from a combination of strap 5r with strap 6r and strap 5l with strap 6l. Securing means 7l, 7r are adapted to allow a lap or lap-sash belt 8 to pass therethrough, thereby securing the ends of straps 5l, 5r, 6l and 6r relative to the vehicle.

Hip strap 6l is attached to left upper portion 3, whilst hip strap 6r is attached to right portion 4. Shoulder straps 9l, 9r are also attached to respective upper portions 3 and 4. Preferably, hip strap 6l and shoulder strap 9l, and hip strap 6r and shoulder strap 9r are continuous. The junction of the hip and shoulder straps on the respective left and right sides is defined by the point of which the straps are connected with left and right upper portions 3 and 4. these points may be altered if upper portions 3 and 4 are freely movable along the combined lengths of the shoulder straps and the hip straps.

Shoulder straps 9l, 9r are connected to anchor strap 10, which in turn is connected to anchor means 11 which is adapted for attachment to a vehicle frame.

Optional adjustment means 12 are provided on shoulder straps 9l, 9r and anchor strap 10 so that the length of the straps may be altered. It should be noted that in altering the length of shoulder straps 9l, 9r the length of hip straps 6l and 6r

may also be effectively altered. Adjustment means may also be provided for crotch strap 5l, 5r, although they are not shown in figure 1.

A booster seat adapted for use with the harness shown in figure 1 is depicted in figure 2. The booster seat has a backrest 13 and a seat 14, the seat 14 being sufficiently thick to substantially raise a person seated therein above the surface upon which the booster seat rests.

Aperture 15 passes through seat 14 and is adapted to allow crotch straps 5l, 5r to pass therethrough in use. Similarly, aperture 16 is provided in backrest 13 so as to allow anchor strap 10 to pass therethrough.

10 The booster seat is equipped with side supports 18 to restrict lateral movement of a person sitting therein. Openings 17 are provided in the side supports 18 to allow hip straps 6l, 6r to pass around the sides of the seat.

15 The straps, buckles and other fittings used in the harness according to the present invention may be any of the suitable equipment known for similar purposes in the prior art.

It is to be understood that various other modification and/or alterations may be made without separating from spirit of the invention as outlined.

## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A harness adapted for use with a seat, the seat having a back rest with an aperture therein, said harness including:

a buckle portion;

5 a left shoulder strap having a left upper end;

a right shoulder strap having a right upper end;

the left shoulder strap and the right shoulder strap being adapted to pass through the aperture with the left upper end and the right upper end being connectable to an anchor point on a frame of a vehicle.

10 2. A harness as claimed in claim 1, wherein the left and right upper ends are connected to an anchor strap, the anchor strap being adapted to pass through the aperture and being connectable to the anchor point on the frame of the vehicle.

3. A harness as claimed in claim 2, wherein the left and right shoulder straps are connected between the buckle portion and the anchor strap.

15 4. A harness according to any one of claims 1 to 3, wherein the left and the right shoulder straps are each connected at a second end to a portion of respective left and right hip straps.

5. A harness according to any one of claims 1 to 3 wherein the left and the right shoulder straps are each connected a second end to the buckle portion.

20 6. A harness according to any one of the preceding claims, wherein the junction of the left and the right shoulder straps is situated behind and above the head of a person wearing the harness.

7. A harness according to any one of claims 1, 2, 3, 5 or 6 wherein the buckle

portion comprises a three-part buckle, having a lower buckle portion to which the crotch straps are attached, a left buckle portion to which the left shoulder and left hip strap are attached and a right buckle portion to which the right shoulder and right hip straps are attached.

5 8. A harness according to claim 5 or claim 7 wherein the respective left shoulder and hip straps and right shoulder and hip straps are integral with each other, the boundary between respective hip and shoulder straps being determined by the position of the buckle portion.

9. A harness according to any one of the preceding claims wherein one or  
10 more of the anchor, shoulder, hip or crotch straps includes adjustment means to allow the length of a strap to be adjusted.

10. A booster seat adapted for use with a harness according to any one of  
claims 1 to 9, said booster seat including a form having a seat portion and a back  
portion, the back portion having an aperture therein through which an anchor strap  
15 or respective left and right shoulder straps may pass;

the seat portion having an aperture therein through which respective left  
and right crotch straps may pass.

11. A booster seat according to claim 10 wherein the form is composed of  
expanded polyurethane.

20 12. A harness substantially as hereinbefore described with reference to Figs. 1  
and 3.

13. A booster seat substantially hereinbefore described with reference to Figs.  
2 and 3.

25 IGC (Australia) Pty Ltd  
By its Registered Patent Attorneys  
Frehills Patent Attorneys

11 November, 1999

